

# Commentary: Easier is not always better than better



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Large, randomized trials with high-risk patients are needed before widespread adoption.

### Central Message

Adoption of del Nido cardioplegia driven by surgeon convenience may be easier, but may not be better or appropriate for all patients and surgeons.

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The quest for the ideal cardioplegia solution dates back to the use of potassium for cardiac arrest by Melrose in 1957.<sup>1</sup> Further improvements were facilitated by the work of Gay and Ebert in 1973, Hearse in 1976, Buckberg in 1978, and Fremes in 1984, thus, enabling safe, open cardiac surgery.<sup>2-5</sup> A cornucopia of choices now exist that provide a quiet, bloodless field for cardiac surgery (Table 1). There is significant variation in practice among surgeons worldwide, with the majority of surgeons in Europe, North America, Australia/New Zealand, and South America using chemical cardioplegia.<sup>6</sup> Variation exists in the degree of dilution of blood with crystalloid cardioplegia and even the use of blood cardioplegia versus crystalloid. It was estimated in 2018 that 10.7% of US surgeons used del Nido cardioplegia.<sup>6</sup>

In this issue of the *Journal*, Timek and colleagues<sup>7</sup> conclude that del Nido cardioplegia is safe and effective in routine and high-risk isolated coronary artery bypass patients. They propensity matched 325 pairs of patients who received del Nido cardioplegia versus blood cardioplegia. They suggested that the need to place a retrograde cardioplegia catheter, to redose cardioplegia, and to manage glucose were cumbersome deterrents to current blood cardioplegia methods. They noted no difference in survival probability at 4 years between groups; however, only 24 patients remained in the del Nido group at 4 years. Troponin T levels were lower and the incidence of atrial fibrillation was greater (54% in the Society of Thoracic Surgeons predicted risk of operative mortality >2.5% subgroup) in the del Nido group. Cardiopulmonary bypass and crossclamp times were longer in the blood cardioplegia group; however, more bypass grafts were performed in this group. Limitations included the following: cardioplegia methods were dependent on surgeon preference and varied within groups, systemic temperature varied, the cardioplegia strategies were used during different time frames, information regarding completeness of revascularization was lacking, and very small patient numbers were in subgroup analyses.

A single, small, randomized trial evaluating del Nido cardioplegia<sup>8</sup> and a meta-analysis<sup>9</sup> were hypothesis generating and indicated the need for a larger multicenter trial, as noted by Fremes and Tam.<sup>10</sup>

Effective myocardial protection is imperative to prevent myocardial injury during global ischemia caused by the placement of an aortic crossclamp. Significant injury is manifested as myocardial stunning following cardiopulmonary bypass. It is conceivable that surgeons may need to tailor the cardioplegia strategy to the individual patient and procedure, and del Nido cardioplegia provides an option in such an armamentarium—one that may be optimal for teaching residents and fellows or when operating room teams are unpredictable, inexperienced, or variable, due to its simplicity. However, we should proceed with caution (Figure 1) to provide the best possible patient care. Isolated coronary artery bypass grafting morbidity and mortality must remain low and within acceptable ranges, particularly due to the current intense scrutiny on surgical outcomes, public reporting, and quality.

Timek and colleagues note that the use of del Nido cardioplegia “enhanced the “flow” of the procedure by

**TABLE 1. A cornucopia of choices of cardioplegia techniques**

Blood (varying dilutions) or crystalloid
Temperature: warm, tepid, cold
Dose administration: intermittent multidose, single, continuous
Location: via completed bypass grafts, antegrade, retrograde
Warm induction
Hot shot
Amino acid enriched



**FIGURE 1.** Large, randomized trials with high-risk patients are needed prior to widespread adoption.

eliminating undue interruptions...facilitating a tidy operative field while permitting expeditious performance of the planned procedure.”<sup>7</sup> Widespread adoption that is driven by surgeon convenience may not be appropriate for all patients. Single-dose antegrade cardioplegia may be easier but may not be better. The jury is still out, and surgeons should proceed with caution until larger, randomized trials including high-risk adult patients document superior myocardial protection with del Nido cardioplegia.

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